**3GPP TSG-RAN WG1 Meeting #101 R1-200xxxx**

**e-meeting, May 25th – June 5th, 2020**

**Agenda Item: 7.2.1.1**

**Source: Moderator (ZTE)**

**Title: FL summary on the maintenance of 2-step RACH channel structure**

**Document for: Discussion**

# Introduction

This document contains the feature lead summary of issues related to maintenance of the channel structure under Rel-16 2-step RACH WI.

The issues mentioned in the submitted TDocs are collected and summarized in Section 2, and the feature lead recommendation for the first round email discussion can be found in Section 3.

# Channel structure maintenance issues

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| Issue # | Issue | Description | Related TDoc # |
| 1 | ROs without associated SSB | PRACH occasions not associated with SSB are considered as valid or invalid | R1-2003365R1-2003601R1-2003724R1-2003856R1-2003978R1-2004131R1-2004213R1-2004347R1-2004381 |
| 2 | MsgA PUSCH overlapping with other UL signal | 2.1 Define the UE behavior in case of MsgA PUSCH overlapping with PUSCH/PUCCH/SRS. | R1-2003365R1-2003455R1-2003503R1-2003724R1-2003855R1-2004130 |
| 2.2 Clarify that MsgA PUSCH is not transmitted if the gap between PRACH and PUSCH is not satisfied | R1-2004347 |
| 3 | MsgA PRACH overlapping with other UL signal | 3.1 Clarification on the UE behavior in case of MsgA PRACH overlapping with PUSCH/PUCCH/SRS. | R1-2003503R1-2003855 |
| 3.2 Partial transmission of MsgA PRACH | R1-2004099R1-2004588 |
| 4 | PUSCH conflicting with slot format | Valid POs and N symbols before the valid PO should be protected from being indicated as downlink | R1-2003365R1-2003855R1-2004099R1-2004213 |
| 5 | Terminology of RAR | Clarify on the terminology for RAR UL grant and fallbackRAR/successRAR in 38.213 and 38.214 | R1-2003365R1-2003601R1-2003724R1-2004382 |
| 6 | Correction on the new PRACH configuration index | Correct the description in 38.211 | R1-2003455R1-2003503R1-2004381 |
| 7 | Intra-slot Frequency hopping | 7.1 Clarification on the guard period between hops  | R1-2003600R1-2003856R1-2004347R1-2004588 |
| 7.2 Clarification on the frequency resource index value for the mapping order | R1-2004347 |
| 7.3 Clarify that a PUSCH occasion consists of the first hop and the second hop | R1-2004381 |
| 8 | Overlapping of PUSCH occasions for a MsgA PUSCH configuration | 8.1 Clarify that UE does not expect to have an overlapping of msgA PUSCH occasions for a MsgA PUSCH configuration | R1-2003978 |
| 8.2 Define a new behaviour to avoid the overlapping of msgA PUSCH occasions | R1-2004130R1-2004381 |
| 9 | Guard period between POs | Clarify the guard period is applied for each PUSCH occasion in each PUSCH slot | R1-2003365 |
| 10 | CFRA related issues | 10.1 FDRA for MsgA PUSCH | R1-2004349 |
| 10.2 Scrambling of MsgA PUSCH for CFRA | R1-2004349 |
| 10.3 Determination of TDRA table for CFRA | R1-2004349 |
| 11 | Criterion of preamble selection  | Clarify the criterion of preamble selection for Type-2 random access in 38.213 | R1-2004440 |
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# Summary and recommendation

Similar as in the last meeting, the # of topics to be discussed for 2-step RACH WI including both sub-AIs is up to 4. One email threads are proposed in AI 7.2.1.2. The following 3 email discussions are proposed for the channel structure part.

Email thread #1:

**MsgA overlapping with other UL signal**

#2. MsgA PUSCH overlapping with other UL signal

#3. MsgA PRACH overlapping with other UL signal

Email thread #2:

**Issues that needs clarifications and discussions**

#6. Correction on the new PRACH configuration index

#9. Clarification on the guard period between POs

#10. CFRA related issues

#11. Criterion of preamble selection

Email thread #3:

**Continue discussion for the issues left from the last meeting**

#1. ROs without associated SSB

#4. PUSCH conflicting with slot format

#5. Terminology of RAR

#7. Intra-slot Frequency hopping

#8. Overlapping of PUSCH occasions for a MsgA PUSCH configuration

The plan is to discuss and conclude all the remaining issues in this meeting. Please indicate in the following table if there is any comment e.g. any issue can be excluded during the preparation phase.

For the issues discussed in the last meeting but with no conclusion, we can directly go for the discussions on the TPs and check if any consensus can be reached.

Any comments?

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| Company | Comment |
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# References

1. R1-2003365 Remaining issues on channel structure for 2-step RACH vivo
2. R1-2003455 Remaining issues of the channel structure for 2-step RACH ZTE, Sanechips
3. R1-2003503 Corrections on channel structure of 2-step RACH Huawei, HiSilicon
4. R1-2003600 Remaining issues on 2-step RACH channel structure CATT
5. R1-2003724 Remaining details of channel structure for 2-step RACH Intel Corporation
6. R1-2003855 Channel Structure for Two-Step RACH Samsung
7. R1-2003978 Remaining issues on channel structure for 2-step RACH Spreadtrum Communications
8. R1-2004099 Discussion on Channel Structure for Two-step RACH OPPO
9. R1-2004130 Remaining details of Channel Structure for 2-step RACH LG Electronics
10. R1-2004213 Remaining issues on channel structure for 2-step RACH Apple
11. R1-2004347 Channel Structure Related Corrections For 2-Step RACH Ericsson
12. R1-2004381 Maintenance for Channel Structure for Two-Step RACH NTT DOCOMO, INC.
13. R1-2004440 Remaining issues and clarification on channel structure for Two-Step RACH Qualcomm Incorporated
14. R1-2004588 Discussion on remaining issues related to channel structure for Two-step RACH Nokia, Nokia Shanghai Bell
15. R1-2003601 Remaining issues on 2-step RACH procedure CATT
16. R1-2003856 Procedure for Two-step RACH Samsung
17. R1-2004131 Remaining details of Procedure for 2-step RACH LG Electronics
18. R1-2004382 Maintenance for Procedure for Two-step RACH NTT DOCOMO, INC.
19. R1-2004349 Remaining Issues for MsgA PUSCH Transmission in CFRA Ericsson

# Appendix

List of proposals in the submitted contributions.

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| TDoc | Proposals |
| [3365]vivo | **Proposal 1: It is up to UE implementation when MsgA PUSCH and PUSCH/PUCCH/SRS are overlapping in time within a same slot or when a gap between MsgA PUSCH transmission and the PUSCH/PUCCH/SRS transmission is separated by less than *N* symbols, where *N* = 2 for **= 0 or **= 1, *N* = 4 for **= 2 or **= 3, and ** is the SCS configuration for the active UL BWP.****Proposal 2: Adopt the following text proposal #1 in Section 8.1A in 38.213**

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| ---------------------------------**Text proposal #1 starts for TS 38.213, Section 8.1A** -------------------------------- =====omitted text ======For single cell operation or for operation with carrier aggregation in a same frequency band, a UE does not transmit MsgA PUSCH and PUSCH/PUCCH/SRS overlapping in time within a same slot or when a gap between the first or last symbol of a MsgA PUSCH transmission is separated by less than *N* symbols from the last or first symbol, respectively, of a PUSCH/PUCCH/SRS transmission, where *N* = 2 for **= 0 or **= 1, *N* = 4 for **= 2 or **= 3, and ** is the SCS configuration for the active UL BWP.=====omitted text ======------------------------------- **Text proposal #1 ends for TS 38.213, Section 8.1A** ----------------------------------- |

**Proposal 3: PRACH occasions not associated with SS/PBCH blocks after an integer number of association periods are not considered as valid PRACH occasions for mapping with msgA PUSCH occasion with DMRS resource for 2-step RACH.****Proposal 4: Adopt the following text proposal #2 in Section 8.1 in 38.213.**

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| ---------------------------------**Text proposal #2 starts for TS 38.213, Section 8.1** --------------------------------8.1 Random access preamble =====omitted text ======An association period, starting from frame 0, for mapping SS/PBCH blocks to PRACH occasions is the smallest value in the set determined by the PRACH configuration period according Table 8.1-1 such that  SS/PBCH blocks are mapped at least once to the PRACH occasions within the association period, where a UE obtains  from the value of *ssb-PositionsInBurst* in *SIB1* or in *ServingCellConfigCommon*. If after an integer number of SS/PBCH blocks to PRACH occasions mapping cycles within the association period there is a set of PRACH occasions or PRACH preambles that are not mapped to  SS/PBCH blocks, no SS/PBCH blocks are mapped to the set of PRACH occasions or PRACH preambles, and the set of PRACH occasions are not considered as valid PRACH occasions for mapping with a PUSCH occasion associated with a DMRS resource for Type-2 random access procedure. An association pattern period includes one or more association periods and is determined so that a pattern between PRACH occasions and SS/PBCH blocks repeats at most every 160 msec. PRACH occasions not associated with SS/PBCH blocks after an integer number of association periods, if any, are not used for PRACH transmissions, and the PRACH occasions are not considered as valid PRACH occasions for mapping with a PUSCH occasion associated with a DMRS resource for Type-2 random access procedure. =====omitted text ======------------------------------- **Text proposal #2 ends for TS 38.213, Section 8.1** ----------------------------------- |

**Proposal 5: Clarify that the guard period configured by *guardPeriodMsgAPUSCH* is applied for each PUSCH occasion in each PUSCH slot.****Proposal 6: Adopt the following text proposal #3 in Section 8.1A in 38.213.**

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| ---------------------------------**Text proposal #3 starts for TS 38.213, Section 8.1A** -------------------------------- =====omitted text ======Consecutive PUSCH occasions within consecutive slots are separated by *guardPeriodMsgAPUSCH* symbols and have same duration. A number of time domain PUSCH occasions in each slot is provided by *nrofMsgAPOperSlot* and a number of consecutive slots that include PUSCH occasions is provided by *nrofSlotsMsgAPUSCH*. =====omitted text ======------------------------------- **Text proposal #3 ends for TS 38.213, Section 8.1A** ----------------------------------- |

**Proposal 7: For a set of symbols of a slot corresponding to a valid MsgA PUSCH occasion and *N*gap symbols before the valid MsgA PUSCH occasion, the UE does not expect to detect a DCI format 2\_0 with an SFI-index field value indicating the set of symbols of the slot as downlink.****Proposal 8: Adopt the following text proposal #4 in Section 11.1 and 11.1.1 in 38.213.**

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| ---------------------------------**Text proposal #4 starts for TS 38.213, Section 11.1** -------------------------------- =====omitted text ======For a set of symbols of a slot corresponding to a valid PRACH occasion and  symbols before the valid PRACH occasion, as described in Sublcause 8.1, or corresponding to a valid PUSCH occasion and  symbols before the valid PUSCH occasion, as described in Sublcause 8.1A, the UE does not receive PDCCH, PDSCH, or CSI-RS in the slot if a reception would overlap with any symbol from the set of symbols. The UE does not expect the set of symbols of the slot to be indicated as downlink by *tdd-UL-DL-ConfigurationCommon* or *tdd-UL-DL-ConfigurationDedicated*.  =====omitted text ======For a set of symbols of a slot corresponding to a valid PRACH occasion and  symbols before the valid PRACH occasion, as described in Sublcause 8.1, or corresponding to a valid PUSCH occasion and  symbols before the valid PUSCH occasion, as described in Sublcause 8.1A, the UE does not expect to detect a DCI format 2\_0 with an SFI-index field value indicating the set of symbols of the slotas downlink. =====omitted text ======------------------------------- **Text proposal #4 ends for TS 38.213, Section 11.1** ----------------------------------- |

**Proposal 9: Separate the terminologies for RAR UL grant and fallbackRAR/successRAR UL grant in 38.213.****Proposal 10: Adopt the following text proposal #5 in Section 11.1 in 38.213.**

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| ---------------------------------**Text proposal #5 starts for TS 38.213, Section 11.1** --------------------------------11.1 Slot configuration =====omitted text ======If a UE is not configured to monitor PDCCH for DCI format 2\_0, for a set of symbols of a slot that are indicated as flexible by *tdd-UL-DL-ConfigurationCommon* and *tdd*-*UL-DL-ConfigurationDedicated* if provided, or when *tdd-UL-DL-ConfigurationCommon* and *tdd*-*UL-DL-ConfigurationDedicated* are not provided to the UE- the UE receives PDSCH or CSI-RS in the set of symbols of the slot if the UE receives a corresponding indication by a DCI format- the UE transmits PUSCH, PUCCH, PRACH, or SRS in the set of symbols of the slot if the UE receives a corresponding indication by a DCI format or a RAR UL grant or a fallbackRAR UL grant or a successRAR =====omitted text ======11.1.1 UE procedure for determining slot format =====omitted text ======For a set of symbols of a slot, a UE does not expect to detect a DCI format 2\_0 with an SFI-index field value indicating the set of symbols in the slot as downlink and to detect a DCI format 0\_0, DCI format 0\_1, DCI format 1\_0, DCI format 1\_1, DCI format 2\_3, or a RAR UL grant or a fallbackRAR UL grant or a successRAR indicating to the UE to transmit PUSCH, PUCCH, PRACH, or SRS in the set of symbols of the slot.  =====omitted text ======For a set of symbols of a slot indicated to a UE as flexible by *tdd-UL-DL-ConfigurationCommon* and *tdd-UL-DL-ConfigurationDedicated* if provided, or when *tdd-UL-DL-ConfigurationCommon* and *tdd-UL-DL-ConfigurationDedicated* are not provided to the UE, and if the UE detects a DCI format 2\_0 providing a format for the slot using a slot format value other than 255- if an SFI-index field value in DCI format 2\_0 indicates the set of symbols of the slot as flexible and the UE detects a DCI format or a RAR UL grant or a fallbackRAR UL grant or a successRAR indicating to the UE to transmit PUSCH, PUCCH, PRACH, or SRS in the set of symbols of the slot the UE transmits the PUSCH, PUCCH, PRACH, or SRS in the set of symbols of the slot- if an SFI-index field value in DCI format 2\_0 indicates the set of symbols of the slot as flexible, and the UE does not detect a DCI format indicating to the UE to receive PDSCH or CSI-RS, or the UE does not detect a DCI format or a RAR UL grant or a fallbackRAR UL grant or a successRAR indicating to the UE to transmit PUSCH, PUCCH, PRACH, or SRS in the set of symbols of the slot, the UE does not transmit or receive in the set of symbols of the slot- a UE does not expect to detect an SFI-index field value in DCI format 2\_0 indicating the set of symbols of the slot as downlink and also detect a DCI format or a RAR UL grant or a fallbackRAR UL grant or a successRAR indicating to the UE to transmit SRS, PUSCH, PUCCH, or PRACH, in one or more symbols from the set of symbols of the slot =====omitted text ======For a set of symbols of a slot that are indicated as flexible by *tdd-UL-DL-ConfigurationCommon*, and *tdd-UL-DL-ConfigurationDedicated* if provided, or when *tdd-UL-DL-ConfigurationCommon*, and *tdd-UL-DL-ConfigurationDedicated* are not provided to the UE, and if the UE does not detect a DCI format 2\_0 providing a slot format for the slot- the UE receives PDSCH or CSI-RS in the set of symbols of the slot if the UE receives a corresponding indication by a DCI format- the UE transmits PUSCH, PUCCH, PRACH, or SRS in the set of symbols of the slot if the UE receives a corresponding indication by a DCI format or a RAR UL grant or a fallbackRAR UL grant or a successRAR =====omitted text ======------------------------------- **Text proposal #5 ends for TS 38.213, Section 11.1** ----------------------------------- |

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| [3455] ZTE | ***Proposal 1:*** * If MsgA PUSCH and PUSCH/PUCCH/SRS are overlapping in time within a same slot or when a gap between the first or last symbol of a MsgA PUSCH transmission is separated by less than *N* symbols from the last or first symbol, respectively, of a PUSCH/PUCCH/SRS transmission, it is up to UE implementation to transmit msgA PUSCH or other UL signal (PUSCH/PUCCH/SRS).
* Adopt the TP#1 for Section 8.1A in 38.213.

-----------------------------**Text proposal #1 starts for TS 38.213, Section 8.1** --------------------------8.1A PUSCH for Type-2 random access procedure<Unchanged Text Omitted>A PUSCH occasion is valid if it does not overlap in time and frequency with any PRACH occasion associated with either a Type-1 random access procedure or a Type-2 random access procedure. Additionally, if a UE is provided *tdd-UL-DL-ConfigurationCommon*, a PUSCH occasion is valid if - it is within UL symbols, or - it does not precede a SS/PBCH block in the PUSCH slot and starts at least symbols after a last downlink symbol and at least symbols after a last SS/PBCH block symbol, where is provided in Table 8.1-2.For Type-2 random access procedure, and for single cell operation or for operation with carrier aggregation in a same frequency band, a UE may not transmit both the MsgA PUSCH and the PUSCH/PUCCH/SRS in a same slot or when a gap between the first or last symbol of a MsgA PUSCH transmission in a first slot is separated by less than  symbols from the last or first symbol, respectively, of a PUSCH/PUCCH/SRS transmission in a second slot where  for  or ,  for  or , and  is the SCS configuration for the active UL BWP. <Unchanged Text Omitted>---------------------------- **Text proposal #1 ends for TS 38.213, Section 8.1** ----------------------------***Proposal 2:**** Adopt the TP#2 for 38.211, to correct the applicable tables for the new PRACH configuration index.

-----------------------------**Text proposal #2 starts for TS 38.211, Section 6.3.3.2** --------------------------6.3.3.2 Mapping to physical resources<Unchanged Text Omitted>Random access preambles can only be transmitted in the time resources obtained from Tables 6.3.3.2-2 to 6.3.3.2-4 and depends on FR1 or FR2 and the spectrum type as defined in [8, TS38.104]. The PRACH configuration index in Tables 6.3.3.2-2 to 6.3.3.2-4 is- for Table 6.3.3.2-3 given by the higher-layer parameter *prach-ConfigurationIndexNew* if configured, otherwise by the higher-layer parameter *prach-ConfigurationIndex,* or by *msgA-prach-ConfigurationIndex* and *msgA-prach-ConfigurationIndexNew* if configured; and- for Tables 6.3.3.2-2 and 6.3.3.2-4 given by the higher-layer parameter *prach-ConfigurationIndex,* or by *msgA-prach-ConfigurationIndex* ~~and~~ *~~msgA-prach-ConfigurationIndexNew~~*if configured.<Unchanged Text Omitted>---------------------------- **Text proposal #2 ends for TS 38.213, Section 6.3.3.2** ---------------------------- |
| [3503] HW | ***Proposal 1:*** *To complete the UE behavior of msgA PUSCH overlapping with PRACH and other UL signals, adopt TP#1 in the Appendix.*Text proposal #1 for TS 38.213 Clause 8:============================= Unchanged part omitted ===========================For single cell operation or for operation with carrier aggregation in a same frequency band, a UE does not transmit PRACH and PUSCH/PUCCH/SRS including PUSCH for MsgA in a same slot or when a gap between the first or last symbol of a PRACH transmission in a first slot is separated by less than  symbols from the last or first symbol, respectively, of a PUSCH/PUCCH/SRS transmission including PUSCH for MsgA in a second slot where  for  or ,  for  or , and  is the SCS configuration for the active UL BWP.8.1A PUSCH for Type-2 random access procedureFor a Type-2 random access procedure, a UE transmits a PUSCH, when applicable, after transmitting a PRACH. The UE encodes a transport block provided for the PUSCH transmission using redundancy version number 0. For single cell operation or for operation with carrier aggregation in a same frequency band, a UE does not transmit PUSCH for Type-2 random access procedure and PUCCH/SRS or PUSCH not for Type-2 random access procedure in a same slot or when a gap between the first or last symbol of a PUSCH transmission for Type-2 random access procedure in a first slot is separated by less than  symbols from the last or first symbol, respectively, of a PUCCH/SRS or PUSCH not for Type-2 random access procedure transmission in a second slot where  for  or ,  for  or , and  is the SCS configuration for the active UL BWP.============================= Unchanged part omitted ===========================***Proposal 2:*** *To correct the operations of msgA PRACH configuration index, adopt TP#2 in the Appendix.*Text proposal #2 for TS 38.211 Clause 6.3.3.2:============================= Unchanged part omitted ===========================Random access preambles can only be transmitted in the time resources obtained from Tables 6.3.3.2-2 to 6.3.3.2-4 and depends on FR1 or FR2 and the spectrum type as defined in [8, TS38.104]. The PRACH configuration index in Tables 6.3.3.2-2 to 6.3.3.2-4 is- for Table 6.3.3.2-3 given by the higher-layer parameter *prach-ConfigurationIndexNew* if configured, otherwise by the higher-layer parameter *prach-ConfigurationIndex,* or by *msgA-prach-ConfigurationIndex* and *msgA-prach-ConfigurationIndexNew* if configured; and- for Tables 6.3.3.2-2 and 6.3.3.2-4 given by the higher-layer parameter *prach-ConfigurationIndex,* or by *msgA-prach-ConfigurationIndex* if configured.============================= Unchanged part omitted =========================== |
| [3600, 3601] CATT | [3600]**Proposal 1: We suggest adding Understanding 1 on clarification on the guard period between hops to RAN#1 agreement of 2s RACH.****Proposal 2: TP#2 in Appendix [1] is unnecessary because current spec is clear to MSGA PUSCH resource mapping**[3601]**Proposal 1: We prefer to these ROs not associated with SS/PBCH blocks are valid for RO-to-PO mapping. Current spec needn’t be changed.****Proposal 2: We suggest applying to “RAR UL grant” includes both RAR UL grant for 4-step RACH and fallbackRAR UL grant for 2-step RACH. In addition, we suggest adding the word “success RAR” to section 11.1 in 38.213 in order to make spec more complete. Below TPs for TS 38.214& TS 38.213 are adopted.**----------------------------------------Start of TP for TS 38.214 -------------------------------------------------------<Unchanged Text Omitted>5.1 UE procedure for receiving the physical downlink shared channelWhen receiving PDSCH in response to a PUSCH transmission scheduled by a RAR UL grant or corresponding PUSCH retransmission, or when receiving PDSCH in response to a PUSCH for Type-2 random access procedure, or corresponding PUSCH retransmission, the UE may assume that the DM-RS port of PDSCH is quasi co-located with the SS/PBCH block the UE selected for RACH association and transmission with respect to Doppler shift, Doppler spread, average delay, delay spread, spatial RX parameters when applicable.<Unchanged Text Omitted>6.1.2.2 Resource allocation in frequency domainThe UE shall determine the resource block assignment in frequency domain using the resource allocation field in the detected PDCCH DCI except for a PUSCH transmission scheduled by a RAR UL grant, in which case the frequency domain resource allocation is determined according to clause 8.3 of [6, 38.213] or clause X.Y of [6, 38.213] respectively. Three uplink resource allocation schemes type 0, type 1 and type 2 are supported. Uplink resource allocation scheme type 0 is supported for PUSCH only when transform precoding is disabled. Uplink resource allocation scheme type 1 and type 2 are supported for PUSCH for both cases when transform precoding is enabled or disabled.<Unchanged Text Omitted>6.1.3 UE procedure for applying transform precoding on PUSCHFor a PUSCH scheduled by RAR UL grant, or for a PUSCH scheduled by DCI format 0\_0 with CRC scrambled by TC-RNTI, the UE shall consider the transform precoding either 'enabled' or 'disabled' according to the higher layer configured parameter *msg3-transformPrecoder.*<Unchanged Text Omitted>6.1.4.1 Modulation order and target code rate determinationFor a PUSCH scheduled by RAR UL grant or for a MsgA PUSCH transmission, or<Unchanged Text Omitted>6.1.4.2 Transport block size determinationFor a PUSCH scheduled by RAR UL grant or <Unchanged Text Omitted>6.3.1 Frequency hopping for PUSCH repetition Type AFor a PUSCH scheduled by RAR UL grant, or by DCI format 0\_0 with CRC scrambled by TC-RNTI, frequency offsets are obtained as described in clause 8.3 of [6, TS 38.213]. For a PUSCH scheduled by DCI format 0\_0/0\_1 or a PUSCH based on a Type2 configured UL grant activated by DCI format 0\_0/0\_1 and for resource allocation type 1, frequency offsets are configured by higher layer parameter *frequencyHoppingOffsetLists* in *pusch-Config*. For a PUSCH scheduled by DCI format 0\_2 or a PUSCH based on a Type2 configured UL grant activated by DCI format 0\_2 and for resource allocation type 1, frequency offsets are configured by higher layer parameter *frequencyHoppingOffsetLists-ForDCIFormat0\_2* in *pusch-Config*.<Unchanged Text Omitted>----------------------------------------End of TP for TS 38.214 -----------------------------------------------------------------------------------------------Start of TP for TS 38.213 -------------------------------------------------------4.2 Transmission timing adjustments<Unchanged Text Omitted>For a timing advance command received on uplink slot  and for a transmission other than a PUSCH scheduled by a RAR UL grant as described in Clause 8.3, or a PUCCH with HARQ-ACK information in response to a successRAR as described in Clause 8.2A, the corresponding adjustment of the uplink transmission timing applies from the beginning of uplink slot  where ,<Unchanged Text Omitted>7.1.1 UE behaviour<Unchanged Text Omitted>If a UE established dedicated RRC connection using a Type-1 random access procedure or a Type-2 random access procedure, as described in Clause 8, and is not provided *P0-PUSCH-AlphaSet* or for a PUSCH transmission scheduled by a RAR UL grant as described in Clause 8.3.<Unchanged Text Omitted>11.1 Slot configuration<Unchanged Text Omitted>If a UE is not configured to monitor PDCCH for DCI format 2\_0, for a set of symbols of a slot that are indicated as flexible by *tdd-UL-DL-ConfigurationCommon* and *tdd*-*UL-DL-ConfigurationDedicated* if provided, or when *tdd-UL-DL-ConfigurationCommon* and *tdd*-*UL-DL-ConfigurationDedicated* are not provided to the UE- the UE receives PDSCH or CSI-RS in the set of symbols of the slot if the UE receives a corresponding indication by a DCI format- the UE transmits PUSCH, PUCCH, PRACH, or SRS in the set of symbols of the slot if the UE receives a corresponding indication by a DCI format, ~~or~~ a RAR UL grant, or successRAR<Unchanged Text Omitted>For a set of symbols of a slot, a UE does not expect to detect a DCI format 2\_0 with an SFI-index field value indicating the set of symbols in the slot as downlink and to detect a DCI format 0\_0, DCI format 0\_1, DCI format 1\_0, DCI format 1\_1, DCI format 2\_3, ~~or~~ a RAR UL grant, or successRAR indicating to the UE to transmit PUSCH, PUCCH, PRACH, or SRS in the set of symbols of the slot. <Unchanged Text Omitted>For a set of symbols of a slot indicated to a UE as flexible by *tdd-UL-DL-ConfigurationCommon* and *tdd-UL-DL-ConfigurationDedicated* if provided, or when *tdd-UL-DL-ConfigurationCommon* and *tdd-UL-DL-ConfigurationDedicated* are not provided to the UE, and if the UE detects a DCI format 2\_0 providing a format for the slot using a slot format value other than 255- if one or more symbols from the set of symbols are symbols in a CORESET configured to the UE for PDCCH monitoring, the UE receives PDCCH in the CORESET only if an SFI-index field value in DCI format 2\_0 indicates that the one or more symbols are downlink symbols- if an SFI-index field value in DCI format 2\_0 indicates the set of symbols of the slot as flexible and the UE detects a DCI format indicating to the UE to receive PDSCH or CSI-RS in the set of symbols of the slot, the UE receives PDSCH or CSI-RS in the set of symbols of the slot- if an SFI-index field value in DCI format 2\_0 indicates the set of symbols of the slot as flexible and the UE detects a DCI format , ~~or~~ a RAR UL grant, or successRAR indicating to the UE to transmit PUSCH, PUCCH, PRACH, or SRS in the set of symbols of the slot the UE transmits the PUSCH, PUCCH, PRACH, or SRS in the set of symbols of the slot- if an SFI-index field value in DCI format 2\_0 indicates the set of symbols of the slot as flexible, and the UE does not detect a DCI format indicating to the UE to receive PDSCH or CSI-RS, or the UE does not detect a DCI format, ~~or~~ a RAR UL grant, or successRAR indicating to the UE to transmit PUSCH, PUCCH, PRACH, or SRS in the set of symbols of the slot, the UE does not transmit or receive in the set of symbols of the slot- if the UE is configured by higher layers to receive PDSCH or CSI-RS in the set of symbols of the slot, the UE receives the PDSCH or the CSI-RS in the set of symbols of the slot only if an SFI-index field value in DCI format 2\_0 indicates the set of symbols of the slot as downlink- if the UE is configured by higher layers to receive DL PRS in the set of symbols of the slot, the UE receives the DL PRS in the set of symbols of the slot only if an SFI-index field value in DCI format 2\_0 indicates the set of symbols of the slot as downlink or flexible.- if the UE is configured by higher layers to transmit PUCCH, or PUSCH, or PRACH in the set of symbols of the slot, the UE transmits the PUCCH, or the PUSCH, or the PRACH in the slot only if an SFI-index field value in DCI format 2\_0 indicates the set of symbols of the slot as uplink- if the UE is configured by higher layers to transmit SRS in the set of symbols of the slot, the UE transmits the SRS only in a subset of symbols from the set of symbols of the slot indicated as uplink symbols by an SFI-index field value in DCI format 2\_0- a UE does not expect to detect an SFI-index field value in DCI format 2\_0 indicating the set of symbols of the slot as downlink and also detect a DCI format, ~~or~~ a RAR UL grant, or successRAR indicating to the UE to transmit SRS, PUSCH, PUCCH, or PRACH, in one or more symbols from the set of symbols of the slot<Unchanged Text Omitted>For a set of symbols of a slot that are indicated as flexible by *tdd-UL-DL-ConfigurationCommon*, and *tdd-UL-DL-ConfigurationDedicated* if provided, or when *tdd-UL-DL-ConfigurationCommon*, and *tdd-UL-DL-ConfigurationDedicated* are not provided to the UE, and if the UE does not detect a DCI format 2\_0 providing a slot format for the slot- the UE receives PDSCH or CSI-RS in the set of symbols of the slot if the UE receives a corresponding indication by a DCI format- the UE transmits PUSCH, PUCCH, PRACH, or SRS in the set of symbols of the slot if the UE receives a corresponding indication by a DCI format, ~~or~~ a RAR UL grant, successRAR- the UE receives PDCCH as described in Clause 10.1<Unchanged Text Omitted>----------------------------------------End of TP for TS 38.213 ------------------------------------------------------- |
| [3724] Intel | **Proposal 1*** *PRACH occasions not associated with SS/PBCH blocks after an integer number of association periods, if any, are not considered as valid PRACH occasions.*
* *Adopt the TP in Section 2 for PRACH validation rule.*

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| <Unchanged Text Omitted>An association period, starting from frame 0, for mapping SS/PBCH blocks to PRACH occasions is the smallest value in the set determined by the PRACH configuration period according Table 8.1-1 such that  SS/PBCH blocks are mapped at least once to the PRACH occasions within the association period, where a UE obtains  from the value of *ssb-PositionsInBurst* in *SIB1* or in *ServingCellConfigCommon*. If after an integer number of SS/PBCH blocks to PRACH occasions mapping cycles within the association period there is a set of PRACH occasions or PRACH preambles that are not mapped to  SS/PBCH blocks, no SS/PBCH blocks are mapped to the set of PRACH occasions or PRACH preambles. The set of PRACH occasions are not considered as valid PRACH occasions for Type-2 random access procedure. An association pattern period includes one or more association periods and is determined so that a pattern between PRACH occasions and SS/PBCH blocks repeats at most every 160 msec. PRACH occasions not associated with SS/PBCH blocks after an integer number of association periods, if any, are not used for PRACH transmissions. The PRACH occasions are not considered as valid PRACH occasions for Type-2 random access procedure.<Unchanged Text Omitted> |

**Proposal 2*** *Adopt the TP in Section 3 for alignment of RAR terminology.*

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| <Unchanged Text Omitted>If a UE is not configured to monitor PDCCH for DCI format 2\_0, for a set of symbols of a slot that are indicated as flexible by *tdd-UL-DL-ConfigurationCommon* and *tdd*-*UL-DL-ConfigurationDedicated* if provided, or when *tdd-UL-DL-ConfigurationCommon* and *tdd*-*UL-DL-ConfigurationDedicated* are not provided to the UE- the UE receives PDSCH or CSI-RS in the set of symbols of the slot if the UE receives a corresponding indication by a DCI format- the UE transmits PUSCH, PUCCH, PRACH, or SRS in the set of symbols of the slot if the UE receives a corresponding indication by a DCI format, ~~or~~ a RAR UL grant, fallbackRAR UL grant, or successRAR<Unchanged Text Omitted> |

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| <Unchanged Text Omitted>For a set of symbols of a slot, a UE does not expect to detect a DCI format 2\_0 with an SFI-index field value indicating the set of symbols in the slot as downlink and to detect a DCI format 0\_0, DCI format 0\_1, DCI format 1\_0, DCI format 1\_1, DCI format 2\_3, ~~or~~ a RAR UL grant, fallbackRAR UL grant, or successRAR indicating to the UE to transmit PUSCH, PUCCH, PRACH, or SRS in the set of symbols of the slot. <Unchanged Text Omitted> |

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| <Unchanged Text Omitted>For a set of symbols of a slot indicated to a UE as flexible by *tdd-UL-DL-ConfigurationCommon* and *tdd-UL-DL-ConfigurationDedicated* if provided, or when *tdd-UL-DL-ConfigurationCommon* and *tdd-UL-DL-ConfigurationDedicated* are not provided to the UE, and if the UE detects a DCI format 2\_0 providing a format for the slot using a slot format value other than 255- if one or more symbols from the set of symbols are symbols in a CORESET configured to the UE for PDCCH monitoring, the UE receives PDCCH in the CORESET only if an SFI-index field value in DCI format 2\_0 indicates that the one or more symbols are downlink symbols- if an SFI-index field value in DCI format 2\_0 indicates the set of symbols of the slot as flexible and the UE detects a DCI format indicating to the UE to receive PDSCH or CSI-RS in the set of symbols of the slot, the UE receives PDSCH or CSI-RS in the set of symbols of the slot- if an SFI-index field value in DCI format 2\_0 indicates the set of symbols of the slot as flexible and the UE detects a DCI format , ~~or~~ a RAR UL grant, fallbackRAR UL grant, or successRAR indicating to the UE to transmit PUSCH, PUCCH, PRACH, or SRS in the set of symbols of the slot the UE transmits the PUSCH, PUCCH, PRACH, or SRS in the set of symbols of the slot- if an SFI-index field value in DCI format 2\_0 indicates the set of symbols of the slot as flexible, and the UE does not detect a DCI format indicating to the UE to receive PDSCH or CSI-RS, or the UE does not detect a DCI format, ~~or~~ a RAR UL grant, fallbackRAR UL grant, or successRAR indicating to the UE to transmit PUSCH, PUCCH, PRACH, or SRS in the set of symbols of the slot, the UE does not transmit or receive in the set of symbols of the slot- if the UE is configured by higher layers to receive PDSCH or CSI-RS in the set of symbols of the slot, the UE receives the PDSCH or the CSI-RS in the set of symbols of the slot only if an SFI-index field value in DCI format 2\_0 indicates the set of symbols of the slot as downlink- if the UE is configured by higher layers to receive DL PRS in the set of symbols of the slot, the UE receives the DL PRS in the set of symbols of the slot only if an SFI-index field value in DCI format 2\_0 indicates the set of symbols of the slot as downlink or flexible.- if the UE is configured by higher layers to transmit PUCCH, or PUSCH, or PRACH in the set of symbols of the slot, the UE transmits the PUCCH, or the PUSCH, or the PRACH in the slot only if an SFI-index field value in DCI format 2\_0 indicates the set of symbols of the slot as uplink- if the UE is configured by higher layers to transmit SRS in the set of symbols of the slot, the UE transmits the SRS only in a subset of symbols from the set of symbols of the slot indicated as uplink symbols by an SFI-index field value in DCI format 2\_0- a UE does not expect to detect an SFI-index field value in DCI format 2\_0 indicating the set of symbols of the slot as downlink and also detect a DCI format, ~~or~~ a RAR UL grant, fallbackRAR UL grant, or successRAR indicating to the UE to transmit SRS, PUSCH, PUCCH, or PRACH, in one or more symbols from the set of symbols of the slot<Unchanged Text Omitted> |

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| <Unchanged Text Omitted>For a set of symbols of a slot that are indicated as flexible by *tdd-UL-DL-ConfigurationCommon*, and *tdd-UL-DL-ConfigurationDedicated* if provided, or when *tdd-UL-DL-ConfigurationCommon*, and *tdd-UL-DL-ConfigurationDedicated* are not provided to the UE, and if the UE does not detect a DCI format 2\_0 providing a slot format for the slot- the UE receives PDSCH or CSI-RS in the set of symbols of the slot if the UE receives a corresponding indication by a DCI format- the UE transmits PUSCH, PUCCH, PRACH, or SRS in the set of symbols of the slot if the UE receives a corresponding indication by a DCI format, ~~or~~ a RAR UL grant, fallbackRAR UL grant, or successRAR- the UE receives PDCCH as described in Clause 10.1<Unchanged Text Omitted> |

**Proposal 3*** *For single cell or intra-band CA scenario, when MsgA PUSCH and PUCCH/PUSCH/SRS are in a same slot or the gap between MsgA PUSCH and PUCCH/PUSCH/SRS is less than N symbols*
	+ *MsgA PUSCH is dropped when colliding with dynamically scheduled uplink transmission or HARQ-ACK feedback.*
	+ *It is up to UE implementation to handle collision between MsgA PUSCH and uplink transmission which is configured or semi-persistent scheduled.*
* *Adopt the TP in Section 4 for collision handling between MsgA PUSCH and other uplink channels/signals.*

The corresponding text proposal in Section 8.1A in TS38.213 is listed as follows:

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| <Unchanged Text Omitted>For single cell operation or for operation with carrier aggregation in a same frequency band, a UE is expected to only transmit aperiodic SRS, PUSCH scheduled by DCI format, or PUCCH with HARQ-ACK information if the msgA PUSCH and aperiodic SRS, PUSCH scheduled by DCI format, or PUCCH with HARQ-ACK information in a same slot or when a gap between the first or last symbol of a msgA PUSCH transmission in a first slot is separated by less than symbols from the last or first symbol, respectively, of an aperiodic SRS, PUSCH scheduled by DCI or PUCCH with HARQ-ACK information in a second slot, where for or , for or , and is the SCS configuration for the active UL BWP. For single cell operation or for operation with carrier aggregation in a same frequency band, a UE does not transmit both msgA PUSCH and periodic or semi-persistent SRS, PUSCH configured by *ConfiguredGrantConfig* or *semiPersistentOnPUSCH*, or PUCCH with CSI report or SR in a same slot or when a gap between the first or last symbol of a msgA PUSCH transmission in a first slot is separated by less than symbols from the last or first symbol, respectively, of a periodic or semi-persistent SRS, PUSCH configured by *ConfiguredGrantConfig* or *semiPersistentOnPUSCH*, or PUCCH with CSI report or SR transmission in a second slot. <Unchanged Text Omitted> |

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| [3855, 3856] SS | [3855]***Observation 1: the validity of PUSCH occasion should be protected as similar to valid RO in order to keep the preamble-PUSCH mapping steady.*** ***Proposal 1: the valid PUSCH occasion in msgA and the Ngap before a valid PUSCH occasion should be protected from being indicated as downlink.*** ***Proposal 2: Adopt following TP in section 11.1 in TS38.213:***======================== section 11.1 in TS38.213 unchanged part omitted ========================“For a set of symbols of a slot corresponding to a valid PRACH occasion and  symbols before the valid PRACH occasion, as described in Sublcause 8.1, or a valid PUSCH occasion and  symbols before the valid PUSCH occasion, as described in Sublcause 8.1A, the UE does not receive PDCCH, PDSCH, or CSI-RS in the slot if a reception would overlap with any symbol from the set of symbols. The UE does not expect the set of symbols of the slot to be indicated as downlink by *tdd-UL-DL-ConfigurationCommon* or *tdd-UL-DL-ConfigurationDedicated*.” ====================================== End ===========================================***Observation 2: There is lack of discussion on the PRACH and this PUSCH/PUCCH especially when they are with larger priority index.******Proposal 3: msgA PRACH should have same priority with PUSCH/PUCCH with larger priority index and the priority consideration in Table 1 should be supported.******Proposal 4: Adopt following TPs in section 8.1 and section 8.1A in TS38.213:***========================== 8.1 of 38.213 unchanged part omitted ===============================For single cell operation or for operation with carrier aggregation in a same frequency band, a UE does not transmit PRACH and PUSCH/PUCCH/SRS in a same slot or when a gap between the first or last symbol of a PRACH transmission in a first slot is separated by less than  symbols from the last or first symbol, respectively, of a PUSCH/PUCCH/SRS transmission in a second slot where  for  or ,  for  or , and  is the SCS configuration for the active UL BWP.For Type-2 random access procedure, and for single cell operation or for operation with carrier aggregation in a same frequency band, a UE may not transmit both the msgA PRACH and the PUSCH/PUCCH with larger priority index in a same slot or when a gap between the first or last symbol of a msgA PRACH transmission in a first slot is separated by less than  symbols from the last or first symbol, respectively, of a PUSCH/PUCCH transmission with larger priority index in a second slot where  for  or ,  for  or , and  is the SCS configuration for the active UL BWP. A UE at least transmits msgA PRACH if the msgA PRACH and the SRS, or the PUSCH/PUCCH with smaller priority index in a same slot or when a gap between the first or last symbol of a msgA PRACH transmission in a first slot is separated by less than  symbols from the last or first symbol, respectively, of a SRS transmission or a PUSCH/PUCCH transmission with smaller priority index in a second slot where  for  or ,  for  or , and  is the SCS configuration for the active UL BWP. ====================================== End ===================================================================== 8.1A of 38.213 unchanged part omitted ==============================A PUSCH occasion is valid if it does not overlap in time and frequency with any PRACH occasion associated with either a Type-1 random access procedure or a Type-2 random access procedure. Additionally, if a UE is provided *tdd-UL-DL-ConfigurationCommon*, a PUSCH occasion is valid if - it is within UL symbols, or - it does not precede a SS/PBCH block in the PUSCH slot and starts at least symbols after a last downlink symbol and at least symbols after a last SS/PBCH block symbol, where is provided in Table 8.1-2.For Type-2 random access procedure, and for single cell operation or for operation with carrier aggregation in a same frequency band, a UE may not transmit both the msgA PUSCH and the PUSCH/PUCCH with smaller priority index in a same slot or when a gap between the first or last symbol of a msgA PUSCH transmission in a first slot is separated by less than  symbols from the last or first symbol, respectively, of a PUSCH/PUCCH transmission with smaller priority index in a second slot where  for  or ,  for  or , and  is the SCS configuration for the active UL BWP. A UE at least transmits msgA PUSCH if the msgA PUSCH and the SRS in a same slot or when a gap between the first or last symbol of a msgA PUSCH transmission in a first slot is separated by less than  symbols from the last or first symbol, respectively, of a SRS transmission in a second slot where  for  or ,  for  or , and  is the SCS configuration for the active UL BWP. ====================================== End ===========================================[3856]***Observation 1: It is beneficial to make the leftover RACH resources after SSB-RO mapping to be invalid.******Proposal 1: Make the leftover RACH resources after SSB-RO mapping to be invalid******Proposal 2: adopt the following TP :***-----------------------------**Text proposal starts for TS 38.213, Section 8.1** --------------------------8.1 Random access preamble<Unchanged Text Omitted>An association period, starting from frame 0, for mapping SS/PBCH blocks to PRACH occasions is the smallest value in the set determined by the PRACH configuration period according Table 8.1-1 such that  SS/PBCH blocks are mapped at least once to the PRACH occasions within the association period, where a UE obtains  from the value of *ssb-PositionsInBurst* in *SIB1* or in *ServingCellConfigCommon*. If after an integer number of SS/PBCH blocks to PRACH occasions mapping cycles within the association period there is a set of PRACH occasions that are not mapped to  SS/PBCH blocks, no SS/PBCH blocks are mapped to the set of PRACH occasions, and the set of PRACH occasions or preambles are not considered as valid PRACH occasions or valid preambles for Type-2 random access procedure. An association pattern period includes one or more association periods and is determined so that a pattern between PRACH occasions and SS/PBCH blocks repeats at most every 160 msec. PRACH occasions not associated with SS/PBCH blocks after an integer number of association periods, if any, are not used for PRACH transmissions, and the PRACH occasions are not considered as valid PRACH occasions for Type-2 random access procedure.<Unchanged Text Omitted>---------------------------- **Text proposal ends for TS 38.213, Section 8.1** ----------------------------***Proposal 3: adopt the following TP :***-----------------------------**Text proposal starts for TS 38.211, Section 6.3.1.7**--------------------------6.3.1.7 Mapping from virtual to physical resource blocksVirtual resource blocks shall be mapped to physical resource blocks except for the *guardPeriodMsgA-PUSCH* symbol if provided between two hops for a msgA PUSCH transmission as described in Clause 8.1A [5, TS 38.213] according to non-interleaved mapping. For non-interleaved VRB-to-PRB mapping, virtual resource block is mapped to physical resource block except for PUSCH scheduled by RAR UL grant or PUSCH scheduled by DCI format 0\_0 with CRC scrambled by TC-RNTI in active uplink bandwidth part starting at , including all resource blocks of the initial uplink bandwidth part starting at , and having the same subcarrier spacing and cyclic prefix as the initial uplink bandwidth part, in which case virtual resource block is mapped to physical resource block .---------------------------- **Text proposal ends for TS 38.211, Section 6.3.1.7** ---------------------------- |
| [3978]Spreadtrum | ***Proposal1: Clarify that UE does not expect to have an overlapping of msgA PUSCH occasions for a MsgA PUSCH configuration.***8.1A PUSCH for Type-2 random access procedure--------------------------------------------------- Start of Text Proposal ------------------------------------------------------------------------------------------------------------ Unchanged parts omitted -----------------------------------------------------For mapping one or multiple preambles of a PRACH slot to a PUSCH occasion associated with a DMRS resource, a UE determines a first slot for a first PUSCH occasion in an active UL BWP from *msgA-PUSCH-TimeDomainOffset* that provides an offset, in number of slots in the active UL BWP, relative to the start of a PUSCH slot including the start of each PRACH slot. The UE does not expect to have a PRACH preamble transmission and a PUSCH transmission with a msgA in a PRACH slot or in a PUSCH slot, and the UE does not expect to have an overlapping of msgA PUSCH occasions for a MsgA PUSCH configuration. The UE expects that a first PUSCH occasion in each slot has a same SLIV [6, TS 38.214] for a PUSCH transmission that is provided by *startSymbolAndLengthMsgA-PO*. ---------------------------------------------------- Unchanged parts omitted ---------------------------------------------------------------------------------------------------------- End of Text Proposal --------------------------------------------------------***Proposal 2: Complete the PRACH occasion validation rule that a valid PRACH occasion should have associated SSB(s), which applies to the PRACH occasions configured by both 4-step RACH and 2-step RACH.***8.1 Random access preamble--------------------------------------------------- Start of Text Proposal ------------------------------------------------------------------------------------------------------------ Unchanged parts omitted -----------------------------------------------------For paired spectrum all PRACH occasions are valid if the PRACH occasion associates with SS/PBCH block(s). For unpaired spectrum, - if a UE is not provided *tdd-UL-DL-ConfigurationCommon*, a PRACH occasion in a PRACH slot is valid if it associates with SS/PBCH block(s) and does not precede a SS/PBCH block in the PRACH slot and starts at least  symbols after a last SS/PBCH block reception symbol, where  is provided in Table 8.1-2.- the index of the SS/PBCH block is provided by *ssb-PositionsInBurst* in *SIB1* or in *ServingCellConfigCommon* - If a UE is provided *tdd-UL-DL-ConfigurationCommon*, a PRACH occasion in a PRACH slot is valid if it associates with SS/PBCH block(s) and if - ~~it~~ is within UL symbols, or - ~~it~~ does not precede a SS/PBCH block in the PRACH slot and starts at least  symbols after a last downlink symbol and at least  symbols after a last SS/PBCH block symbol, where  is provided in Table 8.1-2, and if *ChannelAccessType-r16* = *semistatic* is provided, does not overlap with a set of consecutive symbols before the start of a next channel occupancy time where there shall not be any transmissions, as described in [15, TS 37.213]- the index of the SS/PBCH block is provided by *ssb-PositionsInBurst* in *SIB1* or in *ServingCellConfigCommon*. ---------------------------------------------------- Unchanged parts omitted -------------------------------------------------------------------------------------------------------- End of Text Proposal ------------------------------------------------------***Proposal 3: For type-2 random access procedure, the preamble(s) without associated SSB(s) shouldn’t be used for the mapping between preamble(s) and PRU(s).***8.1 Random access preamble--------------------------------------------------- Start of Text Proposal ------------------------------------------------------------------------------------------------------------ Unchanged parts omitted -----------------------------------------------------An association period, starting from frame 0, for mapping SS/PBCH blocks to PRACH occasions is the smallest value in the set determined by the PRACH configuration period according Table 8.1-1 such that  SS/PBCH blocks are mapped at least once to the PRACH occasions within the association period, where a UE obtains  from the value of *ssb-PositionsInBurst* in *SIB1* or in *ServingCellConfigCommon*. If after an integer number of SS/PBCH blocks to PRACH occasions mapping cycles within the association period there is a set of PRACH occasions or PRACH preambles that are not mapped to  SS/PBCH blocks, no SS/PBCH blocks are mapped to the set of PRACH occasions or PRACH preambles. An association pattern period includes one or more association periods and is determined so that a pattern between PRACH occasions and SS/PBCH blocks repeats at most every 160 msec. PRACH occasions not associated with SS/PBCH blocks after an integer number of association periods, if any, are not used for PRACH transmissions, and preambles not associated with SS/PBCH blocks after an integer number of association periods, if any, are not used for mapping preamble(s) to PUSCH occasion associated with a DMRS resource for Type-2 random access procedure.--------------------------------------------------- Unchanged parts omitted ------------------------------------------------------------------------------------------------------------ End of Text Proposal -------------------------------------------------------- |
| [4099]OPPO | ***Observation 1: There is no other specification impact for a partial msgA PRACH transmission.******Proposal 1: For a partial msgA PRACH transmission, the associated PUSCH shall be cancelled.******\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\**** begin\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*8.1A PUSCH for Type-2 random access procedureFor a Type-2 random access procedure, a UE transmits a PUSCH, when applicable, after transmitting a PRACH. The UE encodes a transport block provided for the PUSCH transmission using redundancy version number 0. For operation without shared spectrum channel access, the PUSCH transmission is after the PRACH transmission by at least symbols where for or , for or , and is the SCS configuration for the active UL BWP.A UE does not transmit a PUSCH in a PUSCH occasion if the PUSCH occasion associated with a DMRS resource is not mapped to a preamble of valid PRACH occasions or if the associated PRACH preamble is not transmitted or partially transmitted as described in Clause 7.5 or Clause 11.1. A UE can transmit a PRACH preamble in a valid PRACH occasion if the PRACH preamble is not mapped to a valid PUSCH occasion.< Unchanged parts are omitted >***\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\**** end\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\****Proposal 2: PUSCH occasion and the Ngap symbols before a valid PUSCH occasion shall be protected from being indicated as downlink.******\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\**** begin\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*11.1 Slot configuration < Unchanged parts are omitted >…For a set of symbols of a slot corresponding to a valid PRACH occasion and *N*gap symbols before the valid PRACH occasion, as described in Sublcause 8.1, the UE does not receive PDCCH, PDSCH, or CSI-RS in the slot if a reception would overlap with any symbol from the set of symbols. The UE does not expect the set of symbols of the slot to be indicated as downlink by *tdd-UL-DL-ConfigurationCommon* or *tdd-UL-DL-ConfigurationDedicated*. For a set of symbols of a slot corresponding to a valid PUSCH occasion and  symbols before the valid PUSCH occasion, as described in Sublcause 8.1A, the UE does not receive PDCCH, PDSCH, or CSI-RS in the slot if a reception would overlap with any symbol from the set of symbols. The UE does not expect the set of symbols of the slot to be indicated as downlink by *tdd-UL-DL-ConfigurationCommon* or *tdd-UL-DL-ConfigurationDedicated*. For a set of symbols of a slot indicated to a UE by *pdcch-ConfigSIB1* in *MIB* for a CORESET for Type0-PDCCH CSS set, the UE does not expect the set of symbols to be indicated as uplink by *tdd-UL-DL-ConfigurationCommon*, or *tdd- UL-DL-ConfigurationDedicated*. < Unchanged parts are omitted >11.1.1 UE procedure for determining slot format < Unchanged parts are omitted >…For a set of symbols of a slot corresponding to a valid PRACH occasion and *N*gap symbols before the valid PRACH occasion, as described in Sublcause 8.1, the UE does not expect to detect a DCI format 2\_0 with an SFI-index field value indicating the set of symbols of the slot as downlink. For a set of symbols of a slot corresponding to a valid PUSCH occasion and *N*gap symbols before the valid PUSCH occasion, as described in Sublcause 8.1A, the UE does not expect to detect a DCI format 2\_0 with an SFI-index field value indicating the set of symbols of the slot as downlink. For a set of symbols of a slot indicated to a UE by *pdcch-ConfigSIB1* in *MIB* for a CORESET for Type0-PDCCH CSS set, the UE does not expect to detect a DCI format 2\_0 with an SFI-index field value indicating the set of symbols of the slot as uplink.***\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\**** end\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* |
| [4130,4131] LGE | [4130]***Proposal 1:*** * Define that if two PRACH slots are included in a PUSCH slot, the end of the PUSCH slot including the start of each RACH slots is regarded as the reference point for PUSCH configuration for second RACH slot
* Adopt the TP#1 to capture the random access response in TS 38.213.

============ Start of Text Proposal #1 for TS38.213 [2] ==================8.1A PUSCH for Type-2 random access procedure<Unchanged Text Omitted>For mapping one or multiple preambles of a PRACH slot to a PUSCH occasion associated with a DMRS resource, a UE determines a first slot for a first PUSCH occasion in an active UL BWP from *msgAPUSCH-TimeDomainOffset* that provides an offset, in number of slots in the active UL BWP, relative to the start of a PUSCH slot including the start of ~~each~~ first PRACH slot if a PRACH slot is included in a PUSCH slot or if two PRACH slots are included in a PUSCH slot, otherwise, relative to the end of a PUSCH slot including the start of second PRACH slot if two slots are included in a PUSCH slot. <Unchanged Text Omitted>============ End of Text Proposal for TS38.213 ==================***Proposal 2:*** * UE cannot transmit both magA PUSCH and PUSCH/PUCCH/SRS in same slot or within certain gap for 2-step RACH.
* Adopt the TP#2 to capture the random access response in TS 38.213.

============ Start of Text Proposal #2 for TS38.213 [2] ==================**8.1A PUSCH for Type-2 random access procedure**<--------------------------------------Other parts are omitted---------------------------------------------------------->A PUSCH occasion is valid if it does not overlap in time and frequency with any PRACH occasion associated with either a Type-1 random access procedure or a Type-2 random access procedure. Additionally, if a UE is provided *tdd-UL-DL-ConfigurationCommon*, a PUSCH occasion is valid if - it is within UL symbols, or - it does not precede a SS/PBCH block in the PUSCH slot and starts at least symbols after a last downlink symbol and at least symbols after a last SS/PBCH block symbol, where is provided in Table 8.1-2.For single cell operation or for operation with carrier aggregation in a same frequency band, a UE does not transmit PUSCH for type-2 random access procedure and PUSCH/PUCCH/SRS in a same slot or when a gap between the first or last symbol of a PRACH transmission in a first slot is separated by less than  symbols from the last or first symbol, respectively, of a PUSCH/PUCCH/SRS transmission in a second slot where  for  or ,  for  or , and  is the SCS configuration for the active UL BWP.<--------------------------------------Other parts are omitted---------------------------------------------------------->============ End of Text Proposal for TS38.213 ==================[4131]***Proposal 1:*** Adopt the following TP to capture in TS 38.213 Section 8.1.---------- Text Proposal starts for TS38.213 [1] ----------8.1 Random access preamble<Unchanged Text Omitted>An association period, starting from frame 0, for mapping SS/PBCH blocks to PRACH occasions is the smallest value in the set determined by the PRACH configuration period according Table 8.1-1 such that  SS/PBCH blocks are mapped at least once to the PRACH occasions within the association period, where a UE obtains  from the value of *ssb-PositionsInBurst* in *SIB1* or in *ServingCellConfigCommon*. If after an integer number of SS/PBCH blocks to PRACH occasions mapping cycles within the association period there is a set of PRACH occasions or PRACH preambles that are not mapped to  SS/PBCH blocks, no SS/PBCH blocks are mapped to the set of PRACH occasions or PRACH preambles. An association pattern period includes one or more association periods and is determined so that a pattern between PRACH occasions and SS/PBCH blocks repeats at most every 160 msec. PRACH occasions not associated with SS/PBCH blocks after an integer number of association periods, if any, are not used for PRACH transmissions, and the PRACH occasions are not used for mapping preamble of a PRACH slot to a PUSCH occasion associated with a DMRS resource for Type-2 random access procedure.<Unchanged Text Omitted>---------- Text Proposal ends for TS38.213 ---------- |
| [4213] Apple | **Proposal 1: UE doesn’t expect the symbols for MsgA PUSCH transmission are changed to DL by TDD UL/DL configuration or by SFI.**

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| 11.1 Slot configuration < Unchanged parts are omitted >For a set of symbols of a slot that are indicated to a UE as uplink by *tdd-UL-DL-ConfigurationCommon*, or *tdd-UL-DL- ConfigurationDedicated*, the UE does not receive PDCCH, PDSCH, or CSI-RS when the PDCCH, PDSCH, or CSI-RS overlaps, even partially, with the set of symbols of the slot. For a set of symbols of a slot that are indicated to a UE as downlink by *tdd-UL-DL-ConfigurationCommon*, or *tdd-UL- DL-ConfigurationDedicated*, the UE does not transmit PUSCH, PUCCH, PRACH, or SRS when the PUSCH, PUCCH, PRACH, or SRS overlaps, even partially, with the set of symbols of the slot. For a set of symbols of a slot that are indicated to a UE as flexible by *tdd-UL-DL-ConfigurationCommon*, and *tdd-UL- DL-ConfigurationDedicated* if provided, the UE does not expect to receive both dedicated higher layer parameters configuring transmission from the UE in the set of symbols of the slot and dedicated higher layer parameters configuring reception by the UE in the set of symbols of the slot. For operation on a single carrier in unpaired spectrum, for a set of symbols of a slot indicated to a UE by *ssb- PositionsInBurst* in *SIB1* or *ssb-PositionsInBurst* in *ServingCellConfigCommon*, for reception of SS/PBCH blocks, the UE does not transmit PUSCH, PUCCH, PRACH in the slot if a transmission would overlap with any symbol from the set of symbols and the UE does not transmit SRS in the set of symbols of the slot. The UE does not expect the set of symbols of the slot to be indicated as uplink by *tdd-UL-DL-ConfigurationCommon*, or *tdd-UL-DL- ConfigurationDedicated*, when provided to the UE. For a set of symbols of a slot corresponding to a valid PRACH occasion and *N*gap symbols before the valid PRACH occasion, as described in Sublcause 8.1, or a valid PUSCH occasion and  symbols before the valid PUSCH occasion, as described in Sublcause 8.1A, the UE does not receive PDCCH, PDSCH, or CSI-RS in the slot if a reception would overlap with any symbol from the set of symbols. The UE does not expect the set of symbols of the slot to be indicated as downlink by *tdd-UL-DL-ConfigurationCommon* or *tdd-UL-DL-ConfigurationDedicated*. For a set of symbols of a slot indicated to a UE by *pdcch-ConfigSIB1* in *MIB* for a CORESET for Type0-PDCCH CSS set, the UE does not expect the set of symbols to be indicated as uplink by *tdd-UL-DL-ConfigurationCommon*, or *tdd- UL-DL-ConfigurationDedicated*. < Unchanged parts are omitted >11.1.1 UE procedure for determining slot format < Unchanged parts are omitted >For a set of symbols of a slot that are indicated as downlink/uplink by *tdd-UL-DL-ConfigurationCommon*, or *tdd-UL- DL-ConfigurationDedicated*, the UE does not expect to detect a DCI format 2\_0 with an SFI-index field value indicating the set of symbols of the slot as uplink/downlink, respectively, or as flexible. For a set of symbols of a slot corresponding to SS/PBCH blocks with indexes indicated to a UE by *ssb-PositionsInBurst* in *SIB1,* or by *ssb-PositionsInBurst* in *ServingCellConfigCommon*, the UE does not expect to detect a DCI format 2\_0 with an SFI-index field value indicating the set of symbols of the slot as uplink. For a set of symbols of a slot corresponding to a valid PRACH occasion and *N*gap symbols before the valid PRACH occasion, as described in Sublcause 8.1, or a valid PUSCH occasion and *N*gap symbols before the valid PUSCH occasion, as described in Sublcause 8.1A, the UE does not expect to detect a DCI format 2\_0 with an SFI-index field value indicating the set of symbols of the slot as downlink. For a set of symbols of a slot indicated to a UE by *pdcch-ConfigSIB1* in *MIB* for a CORESET for Type0-PDCCH CSS set, the UE does not expect to detect a DCI format 2\_0 with an SFI-index field value indicating the set of symbols of the slot as uplink.  |

**Proposal 2: For type-2 random access procedure, the RO without associated SSB is not valid RO.**

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| -----------------------------**Text proposal starts for TS 38.213, Section 8.1** --------------------------8.1 Random access preamble<Unchanged Text Omitted>An association period, starting from frame 0, for mapping SS/PBCH blocks to PRACH occasions is the smallest value in the set determined by the PRACH configuration period according Table 8.1-1 such that  SS/PBCH blocks are mapped at least once to the PRACH occasions within the association period, where a UE obtains  from the value of *ssb-PositionsInBurst* in *SIB1* or in *ServingCellConfigCommon*. If after an integer number of SS/PBCH blocks to PRACH occasions mapping cycles within the association period there is a set of PRACH occasions that are not mapped to  SS/PBCH blocks, no SS/PBCH blocks are mapped to the set of PRACH occasions, and the set of PRACH occasions are not considered as valid PRACH occasions for Type-2 random access procedure. An association pattern period includes one or more association periods and is determined so that a pattern between PRACH occasions and SS/PBCH blocks repeats at most every 160 msec. PRACH occasions not associated with SS/PBCH blocks after an integer number of association periods, if any, are not used for PRACH transmissions, and the PRACH occasions are not considered as valid PRACH occasions for Type-2 random access procedure.<Unchanged Text Omitted>---------------------------- **Text proposal ends for TS 38.213, Section 8.1** ---------------------------- |

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| [4347,4349] Ericsson | [4347][Observation 1 According to current MsgA PUSCH configuration and preamble to PRU mapping, UE may determine a MsgA that does not meet the gap requirement between the MsgA preamble and MsgA PUSCH for operation in licensed band.](#_Toc40513908)[Observation 2 Support of a zero-symbol gap (N = 0) between the PRACH and PUSCH parts of MsgA can eliminate an extra LBT operation for several PRACH formats for NR-U.](#_Toc40513909)[Proposal 1 Further discuss the necessity of a TP to clarify that the ROs not associated SSB will be invalid ROs. If a TP is needed, the rules should be applied to ROs for both 2-step RACH and 4-step RACH.](#_Toc40513762)[Proposal 2 Clarify in 38.214 that the length of symbols determined by msgA-PUSCH-TimeDomainAllocation should also exclude the guard symbols between 2 hops in case of frequency hopping for MsgA PUSCH, according to TP 1.](#_Toc40513763)-----------------------------------------start of TP1 for 38.214 section 6.1.2.1---------------------------------------6.1.2.1 Resource allocation in time domainWhen the UE is scheduled to transmit a transport block and no CSI report, or the UE is scheduled to transmit a transport block and a CSI report(s) on PUSCH by a DCI, the *Time domain resource assignment* field value *m* of the DCI provides a row index *m* + 1to an allocated table. The determination of the used resource allocation table is defined in Clause 6.1.2.1.1. The indexed row defines the slot offset *K2*, the start and length indicator *SLIV*, or directly the start symbol *S* and the allocation length *L*, the PUSCH mapping type, and the number of repetitions (if *numberofrepetitions* is present in the resource allocation table) to be applied in the PUSCH transmission. The number of occupied symbols indicated by *SLIV or allocated by L* excludes the guard period when applicable. 🡨--------------------------------------unchanged text omitted------------------------------------🡪------------------------------------------------------end of TP1------------------------------------------------------------[Proposal 3 Capture the conclusion in RAN1 spec. to make it clear on the frequency resource index values, according to text proposal TP2 for 38.213 and make it correct that the start PRB of MsgA PUSCH is described in 38.213 according to TP3 for 38.214.](#_Toc40513764)-----------------------------------------start of TP2 for 38.213 section 8.1A-----------------------------------------8.1A PUSCH for Type-2 random access procedure🡨--------------------------------------unchanged text omitted------------------------------------🡪Each consecutive number of preamble indexes from valid PRACH occasions in a PRACH slot- first, in increasing order of preamble indexes within a single PRACH occasion- second, in increasing order of frequency resource indexes for frequency multiplexed PRACH occasions- third, in increasing order of time resource indexes for time multiplexed PRACH occasions within a PRACH slotare mapped to a valid PUSCH occasion and the associated DMRS resource- first, in increasing order of frequency resource indexes for frequency multiplexed PUSCH occasions, where for the PUSCH occasion with the lowest PRB defined by *frequencyStartMsgA-PUSCH* when frequency hopping in a slot is enabled by *msgA-intraSlotFrequencyHopping*- second, in increasing order of DMRS resource indexes within a PUSCH occasion, where a DMRS resource index is determined first in an ascending order of a DMRS port index and second in an ascending order of a DMRS sequence index [4, TS 38.211]- third, in increasing order of time resource indexes for time multiplexed PUSCH occasions within a PUSCH slot- fourth, in increasing order of indexes for PUSCH slotswhere , is a total number of valid PRACH occasions per association pattern period multiplied by the number of preambles per valid PRACH occasion provided by *msgA-PUSCH-PreambleGroup*, and is a total number of valid PUSCH occasions per PUSCH configuration per association pattern period multiplied by the number of DMRS resource indexes per valid PUSCH occasion provided by *Configuration*.🡨--------------------------------------unchanged text omitted------------------------------------🡪------------------------------------------------------end of TP2-------------------------------------------------------------------------------------------------------start of TP3 for 38.214 section 6.3.1-----------------------------------------6.3.1 Frequency hopping for PUSCH repetition Type A🡨--------------------------------------unchanged text omitted------------------------------------🡪For a MsgA PUSCH the frequency offset is provided by the higher layer parameter as described in [6, TS 38.213.In case of intra-slot frequency hopping, the starting RB in each hop is given by: ,where *i*=0 and *i*=1 are the first hop and the second hop respectively, and  is the starting RB within the UL BWP, as calculated from the resource block assignment information of resource allocation type 1 (described in Clause 6.1.2.2.2) or as calculated from the resource assignment for MsgA PUSCH (described in 38.213) and is the frequency offset in RBs between the two frequency hops. The number of symbols in the first hop is given by , the number of symbols in the second hop is given by , where is the length of the PUSCH transmission in OFDM symbols in one slot.🡨--------------------------------------unchanged text omitted------------------------------------🡪------------------------------------------------------end of TP3-------------------------------------------------------------[Proposal 4 If the MsgA resource the UE determines does not meet the gap requirement between MsgA preamble and PUSCH, the PUSCH is not transmitted, according to text proposal TP4.](#_Toc40513765)[Proposal 5 The presently specified zero-symbol gap (N = 0) requirement between the PRACH and PUSCH parts of MsgA, i.e. gap-less MsgA, is not changed for 2-step RA for operation with shared spectrum channel access, but the operation is clarified according to text proposal TP4.](#_Toc40513766)---------------------------------------start of TP4 for 38.213 section 8.1A-----------------------------------------8.1A PUSCH for Type-2 random access procedureFor a Type-2 random access procedure, a UE transmits a PUSCH, when applicable, after transmitting a PRACH. The UE encodes a transport block provided for the PUSCH transmission using redundancy version number 0. ~~For operation without shared spectrum channel access, t~~The PUSCH transmission is after the PRACH transmission by at least symbols where for or , for or , and is the SCS configuration for the active UL BWP. For operation with shared spectrum channel access, the UE assumes *N* = 0.A UE does not transmit a PUSCH in a PUSCH occasion if the PUSCH occasion associated with a DMRS resource is not mapped to a preamble of valid PRACH occasions or if the associated PRACH preamble is not transmitted as described in Clause 7.5 or Clause 11.1 or if the time gap between the PUSCH occasion and corresponding PRACH occasion is less than symbols for operation without shared spectrum channel access. A UE can transmit a PRACH preamble in a valid PRACH occasion if the PRACH preamble is not mapped to a valid PUSCH occasion.🡨------------------------------------------unchanged text omitted------------------------------------------🡪--------------------------------------------------------end of TP4------------------------------------------------------------[4349]1. Clarify in 38.214 that MsgA PUSCH frequency domain resource allocation is determined according to clause 8.1A of 38.213, according to text proposals TP1.
2. Data scrambling of MsgA PUSCH in CFRA does not need to be associated to preamble ID or RA-RNTI, and should be associated to C-RNTI instead, according to text proposal TP2.
3. For MsgA PUSCH transmission in CFRA, the usage of time domain resource allocation tables should be similar to a normal PUSCH scheduled by DCI 0\_0, according to text proposal TP3.

--------------------------------------start of TP1 for 38.214 section 6.1.2.2-----------------------------------------6.1.2.2 Resource allocation in frequency domainThe UE shall determine the resource block assignment in frequency domain using the resource allocation field in the detected PDCCH DCI except for a PUSCH transmission scheduled by a RAR UL grant or fallbackRAR UL grant, in which case the frequency domain resource allocation is determined according to clause 8.3 of [6, 38.213] or a MsgA PUSCH transmission with frequency domain resource allocation determined according to clause 8.1A~~X.Y~~ of [6, 38.213] ~~respectively~~. Three uplink resource allocation schemes type 0, type 1 and type 2 are supported. Uplink resource allocation scheme type 0 is supported for PUSCH only when transform precoding is disabled. Uplink resource allocation scheme type 1 and type 2 are supported for PUSCH for both cases when transform precoding is enabled or disabled.🡨--------------------------------------unchanged text omitted------------------------------------🡪--------------------------------------------------------end of TP1 ------------------------------------------------------------------------------------------------start of TP2 for 38.211 section 6.3.1.1-----------------------------------------6.3.1.1 Scrambling🡨----------------------------------------unchanged text omitted--------------------------------------🡪The scrambling sequence generator shall be initialized with where-  equals the higher-layer parameter *dataScramblingIdentityPUSCH* if configured and the RNTI equals the C-RNTI, MCS-C-RNTI, SP-CSI-RNTI or CS-RNTI, and the transmission is not scheduled using DCI format 0\_0 in a common search space;- equals the higher-layer parameter *msgA-dataScramblingIdentity* if configured and the PUSCH transmission is triggered by a Type-2 contention-based random access procedure as described in clause 8.1A of [5, TS 38.213];-  otherwise- is the index of the random-access preamble transmitted for ~~m~~MsgA as described in clause 5.1.3A of [11, TS 38.321]and where  equals the RA-RNTI for ~~m~~MsgA in contention-based random access or C-RNTI for MsgA in contention-free random access, and otherwise corresponds to the RNTI associated with the PUSCH transmission as described in clause 6.1 of [6, TS 38.214] and clause 8.3 of [5, TS 38.213].🡨-----------------------------------------unchanged text omitted--------------------------------------🡪-------------------------------------------------------end of TP2 ------------------------------------------------------------------------------------------------start of TP3 for 38.214 section 6.1.2.1.1---------------------------------------6.1.2.1.1 Determination of the resource allocation table to be used for PUSCH🡨-----------------------------------------unchanged text omitted---------------------------------------🡪Table 6.1.2.1.1-1 of 38.214: Applicable PUSCH time domain resource allocation for common search space and DCI format 0\_0 in UE specific search space

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| RNTI | PDCCH search space | *pusch-ConfigCommon* includes *pusch-TimeDomainAllocationList* | *pusch-Config* includes *pusch-TimeDomainAllocationList* | PUSCH time domain resource allocation to apply |
| PUSCH scheduled by MAC RAR as described in clause 8.2 of [6, TS 38.213] or MAC fallback RAR as described in clause X.Y of [6, 38.213] or for MsgA PUSCH transmission in contention based random access | No | - | Default A |
| Yes |  | *pusch-TimeDomainAllocationList* provided in *pusch-ConfigCommon* |
| C-RNTI, MCS-C-RNTI, TC-RNTI, CS-RNTI | Any common search space associated with CORESET 0 | No | - | Default A |
| Yes |  | *pusch-TimeDomainAllocationList* provided in *pusch-ConfigCommon* |
| C-RNTI, MCS-C-RNTI, TC-RNTI, CS-RNTI, SP-CSI-RNTI | Any common search space not associated with CORESET 0,DCI format 0\_0 inUE specific search space,Or MsgA PUSCH transmission in contention free random access | No | No | Default A |
| Yes | No | *pusch-TimeDomainAllocationList* provided in *pusch-ConfigCommon*  |
| No/Yes | Yes | *pusch-TimeDomainAllocationList* provided in *pusch-Config* |

🡨------------------------------------------unchanged text omitted---------------------------------------🡪----------------------------------------end of TP3 for 38.214 section 6.1.2.1.1-------------------------------------- |
| [4381,4382] DCM | [4381]**Proposal 1: Following text proposal is applied to section 6.3.3.2 in TS 38.211.**

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| 6.3.3.2 Mapping to physical resources~Random access preambles can only be transmitted in the time resources obtained from Tables 6.3.3.2-2 to 6.3.3.2-4 and depends on FR1 or FR2 and the spectrum type as defined in [8, TS38.104]. The PRACH configuration index in Tables 6.3.3.2-2 to 6.3.3.2-4 is- for Table 6.3.3.2-3- for type-2 random access procedure if both *msgA-prach-ConfigurationIndex* and *msgA-prach-ConfigurationIndexNew* are not configured or for a type-1 random access procedure, given by the higher-layer parameter *prach-ConfigurationIndexNew* if configured, otherwise by the higher-layer parameter *prach-ConfigurationIndex~~,~~* ~~or by~~ *~~msgA-prach-ConfigurationIndex~~* ~~and~~ *~~msgA-prach-ConfigurationIndexNew~~* ~~if configured~~; and- otherwise, given by the higher-layer parameter *msgA-prach-ConfigurationIndexNew* if configured, otherwise by the higher-layer parameter *msgA-prach-ConfigurationIndex*; and- for Tables 6.3.3.2-2 and 6.3.3.2-4 given by the higher-layer parameter *prach-ConfigurationIndex* or by *msgA-prach-ConfigurationIndex* if configured for a type-2 random access procedure ~~and~~ *~~msgA-prach-ConfigurationIndexNew~~* ~~if configured~~.~ |

**Proposal 2: Following text proposal is applied to section 8.1A in TS 38.213.**

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| 8.1A PUSCH for Type-2 random access procedure~Each consecutive number of preamble indexes from valid PRACH occasions in ~~a~~ PRACH slot(s)- first, in increasing order of preamble indexes within a single PRACH occasion- second, in increasing order of frequency resource indexes for frequency multiplexed PRACH occasions- third, in increasing order of time resource indexes for time multiplexed PRACH occasions within a PRACH slot- fourth, in increasing order of indexes for consecutive PRACH slot(s) indicated by ”Number of PRACH slots within a subframe” or “Number of PRACH slots within a 60 kHz slot” in random access configurations in [4, TS 38.211] if preamble SCS is larger than SCS for the active UL BWPare mapped to a valid PUSCH occasion and the associated DMRS resource- first, in increasing order of frequency resource indexes for frequency multiplexed PUSCH occasions- second, in increasing order of DMRS resource indexes within a PUSCH occasion, where a DMRS resource index is determined first in an ascending order of a DMRS port index and second in an ascending order of a DMRS sequence index [4, TS 38.211]- third, in increasing order of time resource indexes for time multiplexed PUSCH occasions within a PUSCH slot- fourth, in increasing order of indexes for PUSCH slotswhere , is a total number of valid PRACH occasions per association pattern period multiplied by the number of preambles per valid PRACH occasion provided by *msgA-PUSCH-PreambleGroup*, and is a total number of valid PUSCH occasions per PUSCH configuration per association pattern period multiplied by the number of DMRS resource indexes per valid PUSCH occasion provided by *msgA-DMRS-Config*.~ |

**Proposal 3:** * **The leftover ROs within association period and association pattern period are invalid for both 2-step RACH and 4-step RACH.**
* **Following text proposal is applied to section 8.1 in TS 38.213.**

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| 8.1 Random access preamble~An association period, starting from frame 0, for mapping SS/PBCH blocks to PRACH occasions is the smallest value in the set determined by the PRACH configuration period according Table 8.1-1 such that  SS/PBCH blocks are mapped at least once to the PRACH occasions within the association period, where a UE obtains  from the value of *ssb-PositionsInBurst* in *SIB1* or in *ServingCellConfigCommon*. If after an integer number of SS/PBCH blocks to PRACH occasions mapping cycles within the association period there is a set of PRACH occasions that are not mapped to  SS/PBCH blocks, no SS/PBCH blocks are mapped to the set of PRACH occasions~~.~~, and the set of the PRACH occasions are not considered as valid PRACH occasions. An association pattern period includes one or more association periods and is determined so that a pattern between PRACH occasions and SS/PBCH blocks repeats at most every 160 msec. PRACH occasions not associated with SS/PBCH blocks after an integer number of association periods, if any, are not used for PRACH transmissions~~.~~, and the set of the PRACH occasions are not considered as valid PRACH occasions.~ |

**Proposal 4: RAN1 should take either way of followings:*** **Conclude “When indicated by msgA-intraSlotFrequencyHopping for the active UL BWP, a PUSCH occasion consists of the first hop and the second hop”, or**
* **Following text proposal is applied to section 8.1A in TS 38.213.**

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| 8.1A PUSCH for Type-2 random access procedure~A PUSCH occasion for PUSCH transmission is defined by a frequency resource and a time resource, and is associated with a DMRS resource. The DMRS resources are provided by *msgA-DMRS-Configuration*. When indicated by *msgA-intraSlotFrequencyHopping* for the active UL BWP, a PUSCH occasion consists of the first hop and the second hop.~ |

[4382]**Proposal 1:*** **Align the terminology in TS 38.214 with TS 38.213, i.e. “RAR UL grant” includes fallbackRAR UL grant, and add the sentence of “the terminology of “RAR UL grant” includes both the “RAR UL grant” for Type-1 random access procedure and “fallback RAR UL grant” for Type-2 random access procedure.” in TS 38.213.**
* **Following text proposals are applied to TS 38.213 and TS 38.214.**

**TS 38.213**

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| 8 Random access procedure~The terminology of “RAR UL grant” includes both the “RAR UL grant” for Type-1 random access procedure and “fallback RAR UL grant” for Type-2 random access procedure.~ |

**TS 38.214**

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| 5.1 UE procedure for receiving the physical downlink shared channelWhen receiving PDSCH in response to a PUSCH transmission scheduled by a RAR UL grant or corresponding PUSCH retransmission, or when receiving PDSCH in response to a PUSCH for Type-2 random access procedure~~, or a PUSCH scheduled by a fallbackRAR UL grant or corresponding PUSCH retransmission~~, the UE may assume that the DM-RS port of PDSCH is quasi co-located with the SS/PBCH block the UE selected for RACH association and transmission with respect to Doppler shift, Doppler spread, average delay, delay spread, spatial RX parameters when applicable. |

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| 6.1.2.2 Resource allocation in frequency domainThe UE shall determine the resource block assignment in frequency domain using the resource allocation field in the detected PDCCH DCI except for a PUSCH transmission scheduled by a RAR UL grant ~~or fallbackRAR UL grant~~, in which case the frequency domain resource allocation is determined according to clause 8.3 of [6, 38.213] or clause X.Y of [6, 38.213] respectively. Three uplink resource allocation schemes type 0, type 1 and type 2 are supported. Uplink resource allocation scheme type 0 is supported for PUSCH only when transform precoding is disabled. Uplink resource allocation scheme type 1 and type 2 are supported for PUSCH for both cases when transform precoding is enabled or disabled. |

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| 6.1.3 UE procedure for applying transform precoding on PUSCHFor a PUSCH scheduled by RAR UL grant~~, or for a PUSCH scheduled by fallbackRAR UL grant~~, or for a PUSCH scheduled by DCI format 0\_0 with CRC scrambled by TC-RNTI, the UE shall consider the transform precoding either 'enabled' or 'disabled' according to the higher layer configured parameter *msg3-transformPrecoder.* |

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| 6.1.4.1 Modulation order and target code rate determinationFor a PUSCH scheduled by RAR UL grant or ~~for a PUSCH scheduled by a fallbackRAR UL grant or~~for a MsgA PUSCH transmission, orfor a PUSCH scheduled by a DCI format 0\_0 with CRC scrambled by C-RNTI, MCS-C-RNTI, TC-RNTI, CS-RNTI, or for a PUSCH scheduled by a DCI format 0\_1 for DCI format 0\_2 with CRC scrambled by C-RNTI, MCS-C-RNTI, CS-RNTI, SP-CSI-RNTI, or for a PUSCH with configured grant using CS-RNTI, and |

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| [4440]QC | ***Proposal 1: Correct Section 8.1A of TS 38.213 to clarify the PRACH mapping procedures for Type-2 random access, according to the text proposal TP1.***--------------------------------------------------- **Start of TP1 to Section 8.1A of TS 38.213** ----------------------------------------->>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>> unchanged text omitted <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<Each consecutive number of preamble indexes from valid PRACH occasions in a PRACH slot- first, in increasing order of preamble indexes within a single PRACH occasion- second, in increasing order of frequency resource indexes for frequency multiplexed PRACH occasions- third, in increasing order of time resource indexes for time multiplexed PRACH occasions within a PRACH slotare mapped to a valid PUSCH occasion and the associated DMRS resource- first, in increasing order of frequency resource indexes for frequency multiplexed PUSCH occasions- second, in increasing order of DMRS resource indexes within a PUSCH occasion, where a DMRS resource index is determined first in an ascending order of a DMRS port index and second in an ascending order of a DMRS sequence index [4, TS 38.211]- third, in increasing order of time resource indexes for time multiplexed PUSCH occasions within a PUSCH slot- fourth, in increasing order of indexes for PUSCH slotswhere , is a total number of valid PRACH occasions per association pattern period multiplied by the number of preambles per valid PRACH occasion provided by *msgA-PUSCH-PreambleGroup*, and is a total number of valid PUSCH occasions per PUSCH configuration per association pattern period multiplied by the number of DMRS resource indexes per valid PUSCH occasion provided by *msgA-DMRS-Configuration*. **When a UE has selected Type-2 random access procedure and needs to choose one out of multiple preamble indexes () to transmit, the criterion of preamble selection can be configured by the network and signaled in SI or dedicated RRC signaling. If not configured, UE randomly chooses a preamble index.** --------------------------------------------------  **End of TP1 to Section 8.1A of TS 38.213** ------------------------------------------- |
| [4588]Nokia | **Observation 1: Partial MsgA PRACH preamble transmission would only be relevant for a UE in RRC\_connected mode****Proposal 1: Define a robust procedure for cases with partial MagA PRACH preamble transmission.****Proposal 2: In case of partial MsgA PRACH preamble transmission, the UE shall not transmit the MsgA PUSCH****Proposal 3: For the case of partial MsgA PRACH preamble transmission, ask RAN2 for guidance related to how to operate the 2-step RACH procedure (wait for MsgB response or initiate new RACH procedure)****Proposal 4: When a UE is configured with the configurable guard period and have frequency hopping enabled, the offset from the start of a first PO to the subsequent PO is Length plus two times the guard period.****Proposal 5: Adopt the text proposal as presented in the appendix for section 8.1A for current CR for 38.213 [1].****Proposal 6: Adopt the text proposal for section 6.3.1.6 as outlined in the appendix for 38.211**- - - Text proposal for 38.211 - - - 6.3.1.6 Mapping to virtual resource blocksFor each of the antenna ports used for transmission of the PUSCH, the block of complex-valued symbols  shall be multiplied with the amplitude scaling factor  in order to conform to the transmit power specified in [5, TS 38.213] and mapped in sequence starting with  to resource elements in the virtual resource blocks assigned for transmission which meet all of the following criteria: - they are in the virtual resource blocks assigned for transmission, and- the corresponding resource elements in the corresponding physical resource blocks are not used for transmission of the associated DM-RS, PT-RS, or DM-RS intended for other co-scheduled UEs as described in clause 6.4.1.1.3, and- the corresponding resource elements are not use for guard period between frequency hops for transmission of intra-slot frequency hoped transmission of MsgA PUSCH.The mapping to resource elements allocated for PUSCH according to [6, TS 38.214] shall be in increasing order of first the index over the assigned virtual resource blocks, where is the first subcarrier in the lowest-numbered virtual resource block assigned for transmission, and then the index , with the starting position given by [6, TS 38.214]. \*\*\* Unchanged text is omitted \*\*\*- - - Text proposal for 38.211- - -8.1A PUSCH for Type-2 random access procedure\*\*\* Unchanged text is omitted \*\*\*If a UE does not have dedicated RRC configuration, or has an initial UL BWP as an active UL BWP, or is not provided *startSymbolAndLengthMsgA-PO*, *msgA-PUSCH-timeDomainAllocation* provides a SLIV and a PUSCH mapping type for a PUSCH transmission by indicating - first *maxNrofUL-Allocations* values from *PUSCH-TimeDomainResourceAllocationList*, if *PUSCH-TimeDomainResourceAllocationList* is provided in *PUSCH-ConfigCommon*- entries from table 6.1.2.1.1-2 in [6, TS 38.214], if *PUSCH-TimeDomainResourceAllocationList* is not provided in *PUSCH-ConfigCommon*else, the UE is provided a SLIV by *startSymbolAndLengthMsgA-PO*, and a PUSCH mapping type by *mappingTypeMsgA-PUSCH* for a PUSCH transmission. For mapping one or multiple preambles of a PRACH slot to a PUSCH occasion associated with a DMRS resource, a UE determines a first slot for a first PUSCH occasion in an active UL BWP from *msgA-PUSCH-TimeDomainOffset* that provides an offset, in number of slots in the active UL BWP, relative to the start of a PUSCH slot including the start of each PRACH slot. The UE does not expect to have a PRACH preamble transmission and a PUSCH transmission with a msgA in a PRACH slot or in a PUSCH slot. The UE expects that a first PUSCH occasion in each slot has a same SLIV [6, TS 38.214] for a PUSCH transmission that is provided by *startSymbolAndLengthMsgA-PO*. Consecutive PUSCH occasions within each slot are separated by *guardPeriodMsgA-PUSCH* symbols and have same duration. A number of time domain PUSCH occasions in each slot is provided by *nrofMsgA-PO-perSlot* and a number of consecutive slots that include PUSCH occasions is provided by *nrofSlotsMsgA-PUSCH*. A UE is provided a DMRS configuration for a PUSCH transmission in a PUSCH occasion in an active UL BWP by *msgA-DMRS-Configuration*.A UE is provided an MCS for data information in a PUSCH transmission for a PUSCH occasion by *msgA-MCS*.For a PUSCH transmission with frequency hopping in a slot, when indicated by *msgA-intraSlotFrequencyHopping* for the active UL BWP, the frequency offset for the second hop [6, TS 38.214] is determined as described in Clause 8.3, Table 8.3-1 using msgA-HoppingBits instead of . If *guardPeriodMsgA-PUSCH* is provided, a first symbol of the second hop is separated by *guardPeriodMsgA-PUSCH* symbols from the end of a last symbol of the first hop; otherwise, there is no time separation of the PUSCH transmission before and after frequency hopping. If *guardPeriodMsgA-PUSCH* is provided, the amount of symbols for PUSCH transmission is extended by *guardPeriodMsgA-PUSCH* symbols. If the UE is provided with *useInterlacePUSCH-Common*, it shall transmit PUSCH without frequency hopping. A PUSCH transmission uses a same spatial filter as an associated PRACH transmission. \*\*\* Unchanged text is omitted \*\*\* |
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